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SELECTED TRANSLATIONS ON EAST EUROPEAN MATERIALS INDUSTRIES

No 9

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## FOREWORD

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[This is a serial publication containing selected translations on the fuel, electric power, mining, metallurgical, and construction materials industries in Eastern Europe.]

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## CZECHOSLOVAKIA

### THE SIGNIFICANCE OF CAPITAL CONSTRUCTION IN THE FULFILLMENT OF ECONOMIC-POLITICAL TASKS OF THE COAL INDUSTRY

Following is the translation of an article by Inženýr Liboslav Stanek in Uhli (Coal), Vol II, No 12, Prague, December 1960, pages 301-302, 318.

The basic plan for our Third Five-year Plan, approved by the all-State conference of the Communist Party of Czechoslovakia, presupposes capital construction in our entire national economy to reach 322 billion Kcs; this is approximately 59% more than had been invested during the Second Five-year Plan. Investment for the development of industry will be nearly 88% higher than during the Second Five-year Plan. It is necessary to determine the most effective utilization of these means. We realize that during the Third Five-year Plan we will build plants which will also be producing in the period of communism. Therefore in the designing of new plants and in the reconstruction of existing ones we must reach the foremost world standard in investment effects, in technique, in technology, and in economy of operation of newly built and reconstructed plants.

During the past years we have built for the production of fuels a number of new quarries, mines, and preparation plants of which we are not ashamed. Still, we do have certain serious shortcomings in capital construction. In fulfilling the plan for capital construction, shortcomings exist in preparatory and planned documentation as well as in their realization. In the sector of preparatory documentation, we lack construction investment within the planned period of time, and we lack sufficient attention to these tasks on the part of the investors, especially as far as the effectiveness of construction and future profitability of the plant or enterprise is concerned. Investment only seldom is based on potentiality research, although today's investment policies are oriented towards the complete utilization of fuel resources and carries with it the necessity to solve reciprocal relationships in the fuel industry as well as in the power, gas, and chemical industries, and possibly in others. These realities are shown adversely in documentation presented.

On 17 and 18 October 1960, the Department of Fuels and Power held a conference with the representatives of construction association directors, the directors of research, and development organizations and technical representatives. The conference made some plans for capital construction.

In black-coal mines during the construction of new mining fields and unworked mining floes we must choose an average wall length of 200

meters, as long as the size of the floc and natural conditions do not prevent this. For securing the safe operation of these walls, we must equip the wall at once with the newest, immediately supporting reinforcement.

In new hewing projects, we should consider hydraulic props. According to theoretical calculations, the lengthening of the walls from 100 meters to 200 meters creates savings in the mine of up to 20% because of savings of mining shifts, transportation, and maintenance. It is therefore necessary to discover possibilities for achieving the fastest extension of wall lengths through an examination of the technical-operational projects of the plants, especially in the Ostrava-Karvina Mining District, for the Third Five-year Plan and to ascertain the manufacture of efficient rubble conveyers corresponding in length and capacity to these walls. In projects for hewing horizontal seams, mining cutter-loaders are suggested. We must plan for the development and supply of mining cutter-loaders which empty the cut without waste, clear the splintered coal, and increase mining output.

There is a demand for improving the condition and level of mechanization in horizontal work. It is therefore necessary to produce more efficient drilling hammers and quality drilling steel and to ensure the manufacture of proven air pressure amplifiers of type ZT 4/8. We should develop and manufacture a new type of loader with a greater shovel volume ( $0.3 \text{ m}^3$ ) or a loader which operates continually. It is necessary to import stamping cutter-loaders from the USSR of the type PKG-1, or similar to it. It is necessary to use the cutter-loaders also for work in cuts with a smaller coal thickness.

In the Most and Sokolov brown coal districts, we should consider the transition to a quarry type of mining for the basic direction of technical development. We should try to reach a depth of 250 meters and more and to produce by 1970 95% of our output by the quarry method. We must choose the largest possible quarry units in such a way that single-wing quarries will reach a capacity of 5 to 7 million tons a year and double-wing quarries 10 to 15 million tons a year; this should be done not only in quarries which are being newly constructed, but also in quarries which must be reconstructed. We should introduce highly efficient machines with continuous production. In the transportation of coal and (skryvka  $\sqrt{?}$ ) we must introduce conveyer transportation with speed of 5 meters/second. We must also mechanize all auxiliary work in the quarries and determine the concentration of coal preparation in large central preparation plants with the largest possible capacities under given conditions. We must increase production lines to where output reached 300 tons/hour and utilize brown coal in large-pressure gas works, power-production combines, and primarily in large thermal power stations. We must concern ourselves with the utilization of known mining methods for unmineable reserves of brown coal through underground gasification and select construction parts only from prefabricates and large assembly elements, on the basis of part classification.

In the Slovak mines and in the South Moravian lignite district,

it is necessary to apply in the projects of new mining fields the principles of maximal mechanization and automation, of economical, efficient construction, and maximal profitability of the entire deposit. For all the districts, we must develop independent basic conditions of organizational structure of mines and areas and determine the optimum size of mines and areas.

In the South Moravian, South Slovak and partially in the Handlov Districts, we must plan the complete mechanization of mining through the help of mining cutter-loaders and gable reinforcement. In the Novacko and Handlov deposits in seams with thickness over 4 meters, we must continue looking for a solution to the mining method, especially through inter-ceiling and above-ceiling mining.

In all the districts it is necessary to direct attention to a permanent increase of the cuts' capacity. In the projects of preparation and opening, we must apply panel reinforcements and design vertical mining works from poured concrete lowered through a gravity pipeline.

In the South Moravian lignite district, we must consider freezing as the basic method for excavation under conditions of water-carrying sands and (kuravka [?]). To widen the installation of conveyer transportation, along with ensuring its maximal utilization through the concentration of cuts. We must also lengthen belt units and thus limit to the smallest possible number the number of transfers and the number of recesses, and widen the automation of conveyor lines. We must solve the problem of crushing underground through continuous crushers set in front of the main conveyer transportation. In rail transportation, we must introduce automation of filling stations and truck traffic and to carry out the electrification of railroad transportation and mechanize the transportation of materials and equipment. For a decrease of mine maintenance, only those galleries which are absolutely necessary should be cut, and only immediately before they are actually needed for transportation purposes. Besides this, we should determine for these mine works those reinforcements which require the smallest possible maintenance during their useful life.



## CZECHOSLOVAK ECONOMIC BRIEFS

### INVESTIGATIONS OF WATER AND METHANE DRAINAGE IN THE HIDDEN LEVELS OF THE OSTRAVA-KARVINA COAL FIELDS

For the further development of the Ostrava-Karvina Coal District, its eastern portion is of great importance, especially the area in which new mines are being built: Sucha-Stonava, CSM, and Paskov. Regarding the difficult geological conditions, it is necessary to work out a comprehensive method of mining safety investigations of water and methane conditions in the coal fields and to ensure safety during the mining of coal seams through a safe system of water and methane drainage. The article explains specific peculiarities of this problem.

The mines of the Ostrava-Karvina Coal District mine coal in the area between the Bludovice and the Bohumin-Detmarovice wash area, where the coal-ore formation forms a subterranean spine 28 km long and 12 to 20 km wide; this, with the exception of small carbon windows on its ridge, is buried under a three-layer cover; both slopes above the beds of the wash area are articulated by side erosive depressions. These side depressions were hollowed out during the pre-Myocene periods through erosive activity of torrential waters on the surface of carbon sections which were badly damaged tectonically; we use the term "vymol" (wash-outs) for them.

(Prague, Uhli, Vol II, No 12, December 1960, page 303)

### ALL-STATE EXHIBITION: "THE FORESTS MUST LIVE"

In all branches of the national economy it is necessary to decrease the use of wood by the substitution of other suitable material. In our fuel department the directives of the Central Committee of the Communist Party of Czechoslovakia and the government of the Czechoslovak Socialist Republic for developing the Third Five-year Plan, for 1961-1965, state the need for a gradual decrease of the use of mine wood in the deep-well mining operation; in 1965 it should not exceed 65% of the amount used in 1958 per ton of mined coal.

(Prague, Uhli, Vol II, No 12, December 1960, page 324.)

## ANALYSIS OF THE FULFILLMENT OF MINING PRODUCTION PLANS IN PLANTS WITH A SHORTENED WORK PERIOD

During the Third Five-year Plan, all our workers will gradually attain another great achievement, namely, the shortening of the work-week to 42 hours, and in deep-well mines to 40 hours. The shortening will be introduced gradually in individual branches of the national economy. The first branch where this will come into effect is fuels, where already on 1 February 1960 the work period was experimentally shortened in the Ludvik Mine in the Ostrava-Karvina Coal District; during 1960 a shortening of the work period will be put into effect in a number of other plants.

(Prague, Uhli, Vol II, No 12, December 1960, page 320.)

## TECHNIQUE, WORK ORGANIZATION, AND PRODUCTIVITY IN THE OSTRAVA-KARVINA COAL DISTRICT

The directives of the Central Committee of the Communist Party of Czechoslovakia and the government of the Czechoslovak Socialist Republic for the development of the Third Five-year Plan are relying on an increase in the output of black coal in the Ostrava-Karvina Coal District to 30.5 million tons by 1965, along with an increase of the share of machine disengaged and loaded coal to 44%. Cutter loaders and plows will mine 13.1 million tons of coal. Effecting an economical utilization or modern mechanization means that it is necessary to lengthen the average cut to 130 meters and to increase the average progress of the cutting front to 1.57 meters per day. At least 200 cuts will be fitted with all-metal installations and the share of mechanical loading in preparatory work will reach 61%. Increased tasks will be covered mostly by an increase in work productivity.

(Prague, Uhli, Vol II, No 12, December 1960, page 309.)

## HUNGARY

### ALUMINUM IN THE BUILDING INDUSTRY

Following is the translation of an article by Gyorgy Steiner in Ujitok Lapja (Inventors' Journal), Vol XIII, No 12, Budapest, 1961, page 5.7

It is known that the Hungarian bauxite mines are very significant. Bauxite is the ore of aluminum; this metal, due to its many good properties, is of ever-growing importance. The size of the domestic bauxite wealth makes it logical that a scientific institute, the Metal Research Institute, should spend most of its time on aluminum research.

We asked Istvan Varga of the MRI to tell us of a few of the projects.

"First of all," said Mr Varga, "let me illustrate the growth in aluminum. Between 1950 and 1960, domestic aluminum consumption quadrupled. The various industries' present and planned use of aluminum is given below.

	1958	1975
Transportation	30%	29.1%
Electrical industry	45.5%	35.5%
Chemical, food, packaging Industry	8.2%	11.2%
Building industry	2%	11.9%
Kitchenware - mass object	14.3%	6.2%
Agriculture	0	6.1%

"Our task, among others, is to find new aluminum alloys, improve the properties of the present ones, modernize technology, and find newer, better ways of surface protection. Of the industries mentioned in the table, building represents the biggest possibilities and holds the most news. The huge new plans can not be carried out with traditional materials and methods. Aluminum alloys are being introduced in roof panels with various filler materials, as enclosing structures, and as whole roofs. A good example of the latter is the Pasaret tennis courts or the Heavy Industry Pavilion at the Industrial Fair of 1961.

"A constant trouble spot is the method of fastening. Usually welding is the best method, but the physical and chemical properties of aluminum make its welding difficult. Its surface is covered by an oxide layer which melts at 2050° C (aluminum itself melts at 658° C). This oxide layer must be cleared away at the time of the welding

because it obstructs the fusion of the aluminum and the welding rod. An oxide-solvent powder is used in flame welding. Its drawback is that its corrosive materials attack the weld and open it to corrosion. The great amount of heat produced in flame welding deforms and softens the metal.

"These are the reasons why we are turning to electric welding. We are experimenting with two methods: the tungsten electrode and the semi-automatic, reduction electrode. In both cases Ar ambient is used, because after the Ar arc opens the oxide film, it closes the weld from the oxygen of the air and hence prevents the formation of a new oxide layer. In spite of the high temperatures used, there is no harmful heating when a fast, concentrated arc is being used. For the first process, a tungsten electrode is used; in the second, the aluminum welding rod itself fills the role of an electrode. The reduction electrode is supplied by a special apparatus. This method is much faster than the other one, but its disadvantage is the sudden cooling, which traps gas bubbles. We constructed several devices for protecting gas welding, the best of which is shown in the figure below. This is used for the welding of large aluminum rails.

"Two good aluminum welding alloys were developed: NAUTAL, which is used on ships (Al-Mg), and HEGAL, which is designed for structural material (Al-Zn-Mg). The welding is satisfactory and has been utilized.

"We are working on small aluminum buildings: garages, weekend homes, prefabricates. It is important that these be easily assembled; therefore, pressed profiles are used in their construction.

"The building industry is only one area of the infinite applications of aluminum. Our institute is trying to contribute to the practical applications," finished Mr Varga.

#### ILLUSTRATION CAPTIONS

1. Aluminum-plastic (PVC foil) combination hothouse.
2. Assembling an aluminum weekend house
3. Aluminum motorcycle sidecar
4. Aluminum roof structural model
5. Welding large cross-section aluminum rails under protective ambient

POLAND

THE FIVE-YEAR PLAN OF OUR CEMENT INDUSTRY

[Following is the translation of an article by Magister Jerzy Bolkowski in Cement Wapno Gips (Cement Lime Gypsum), Vol XVI/XXVI, No 5, Cracow, May 1961, pp 121-125.]

During the last 20 years the world cement industry has been undergoing an unusually dynamic development. Prior to World War II the world production of cement amounted to 85 million tons; in 1950 it reached the level of 134 million tons; in 1955, 218 million tons, and in 1960, about 312 million tons. This explosive development of the cement industry in the first years after the war was no doubt connected with the rebuilding of destroyed buildings, requiring increased use of cement. Later on the cement industry was spurred on by extensive industrialization in many countries. The fact that a number of Asian and African countries became independent played a considerable role in the demand for cement.

The increase in affluence, bringing with it an increased development in home and industrial building, has prompted and will continue to prompt an unceasing increase in the production of cement, this most universal building material.

Table 1 shows increase in the cement production of the largest producers, both capitalist and socialist.

As is made clear by the table, the tempo of cement production increase in the socialist countries was already in the first Five-year Plan considerably greater than in the capitalist countries. The difference in the dynamics of production increase in favor of the socialist countries will considerably increase in the next five years so that the growth indicator for 1960-1965 is twice as high for the socialist countries.

A particularly dynamic development can be observed in the Chinese People's Republic, the USSR, the GDR, and Rumania, and among Capitalist countries in Japan, India and Italy. Despite the faster tempo of production development -- the socialist countries starting from a lower level of production have not yet reached the average per capita production of the capitalist countries. The more understandable is the intent of the countries of the People's Democracies to steadily increase the production of this valuable material.

Table 1

## Production of cement in millions of tons

Countries	Year			Indicator of increase		Per capita production of cement in 1960
	1950	1955	1960	1950	100%	
				1955	1960	
World production	134.00	218.00	312.00	162.7	232.8	106
A. Socialist countries	21.00	42.60	89.60	202.9	426.7	84
of these:						
Bulgaria	0.60	0.81	1.59	135.0	265.0	202
Czechoslovakia	1.86	2.89	5.05	155.4	271.3	370
The GDR	1.41	2.97	5.03	210.6	356.7	291
Poland	2.51	3.81	6.59	151.8	262.5	220
Rumania	0.87	1.99	3.05	228.7	350.6	165
Hungary	0.80	1.17	1.57	146.3	196.3	157
Yugoslavia	1.22	1.56	2.37 <sup>1)</sup>	127.9	194.3	=
USSR	10.19	22.48	45.50	220.6	446.5	212
China	1.00 <sup>1)</sup>	4.50	16.00	450.0	1600.0	23
B. Capitalist countries	113.00	175.40	222.40	155.2	196.8	119
of these:						
G. Britain	9.90	12.71	13.30	128.4	134.3	254
France	7.41	10.57	14.17	142.1	191.2	311
W. Germany	10.88	18.77	25.16	172.5	231.3	453
Italy	5.14	10.64	15.40	207.0	299.6	312
India	2.65	4.56	7.90 <sup>1)</sup>	172.1	298.2	19
Japan	4.46	19.56	22.86 <sup>1)</sup>	236.8	512.6	244
US	38.72	53.00	53.05 <sup>1)</sup>	136.9	100.1	294

1) estimated

The development of production and the striving to achieve increasingly better economic indicators have had an effect on the forming of new tendencies in technology, in organization of production, and in exploitation. Consequently, there is to be observed a steady increase in the size of the plants which expresses itself equally in the steady increase of the average size of cement plants as well as in the building of large plants with a yearly production capacity of up to a million tons and even more. The views which have prevailed until

recently that the optimal size of cement plants should be within the limits of 300-500 tons capacity per year have ceased to be valid, since it has been proven that large, newly equipped and well organized cement plants have smaller production costs and better indicators of productivity.

A second tendency is to be observed in the field of technology. The dry method is being used increasingly; this method requires less fuel, which further improves the indicator.

The development of the Polish cement industry is in agreement with the principles prevailing in world production, and the tempo of production increase are by several tens of points higher than that of world production. Also, the per capita production in 1960 is twice as high as the average world per capital production and the average per capita production of the capitalist countries. Despite this favorable development of our cement industry, it is not yet close to that of the economically developed capitalist countries, which shows the need for further intensive investment in our cement industry.

As already shown in Table 1, the production of cement in the period 1956-1960 increased from 3,813 thousand tons to 6,593 thousand tons, or by 73%. From the point of view of the assortment of the produced cements this period is characterized by a considerable increase in the production of foundry cements (from 1.5% in 1955 to about 39% in 1960) at the expense of a decrease in the production of portland cement "350" (from about 34% to about 23%) and portland cement "250" (from 57.5% to 33%). This is closely connected with the increase in the use of hearth slag, from 225 thousand tons in 1955 to about 1.4 million tons in 1960.

In the past Five-year Plan the national industry introduced three new kinds of cement, namely: road cement "350", bituminous cement, and sulfitic cement "250".

The increase in production was mainly achieved thanks to the starting of new production units. Between 1956 and 1960 new units with a combined capacity of 3.2 million tons were placed in production. Of this, 1.1 million tons was produced in the cement plants "Zeran" and "Nova Huta", which cooperate with the clinker plant "Wiek", started in 1957; 0.8 million tons was produced in the newly built cement plant "Chelm"; 0.63 million tons by the expanded plant "Przyjazn"; 0.4 million tons in the "Pokojski" cement plant; and 0.2 million tons in the "Odra" cement plant.

In conformity with world tendencies the newly built or expanded plants in Poland have achieved capacities of one million tons. Among these are the "Chelm" plants, "Pokojski" and "Przyjazn" plants.

The newly built as well as the expanded plants were equipped with modern equipment, assuring advantageous productivity of the new or newly expanded plants is the fact that the productivity per worker in the cement industry increased from about 480 tons in 1955 to about 700 tons in 1960. This indicator would have been even better if in 1960 the "Chelm", "Przyjazn" and "Pokojski" cement plants had achieved the planned production capacity, (production readiness of particular lines of production was achieved during 1960).

The development of the cement industry in the world in the last five years will undoubtedly now slow down in the coming years. On the contrary, in the majority of countries it is to be expected that the advance of industrialization and the increase in affluence will force the existing cement plants to increase their production. It is hard to predict what dimensions the world cement production will achieve in 1965 since a prognosis for the capitalist countries is lacking. But as far as the socialist countries are concerned, on the basis of published data it is possible to determine the planned amount of cement production for the last year of the coming five year period. Table 2 shows the planned increase in cement production for the current Five-year Plan in some socialist countries.

Table 2.

Cement Production in Millions of Tons

Country	1960	1965	Percent increase	Per capita production of cement in kg in 1965
USSR	45.50	84.60	185.9	360
Poland	6.59	11.12	168.6	345
Czechoslovakia	5.05	8.75	173.2	620
GDR	5.03	7.97	158.5	450
Rumania	3.05	6.50	212.8	335
Bulgaria	1.59	4.00	252.2	500
Hungary	1.57	2.38	151.5	230

As can be seen in Table 2, all the countries mentioned will considerably increase cement production, and if the growth indicators are in some cases lower than those achieved in the previous Five-year Plan this is explained by the considerably higher level of production in 1960. But as far as the indicators of the per capita production are concerned they will be very high -- in certain cases exceeding the respective indicators of 1960 of the most highly industrialized capitalist countries.

It is foreseen that in 1965 our cement industry will produce 11.12 million tons of cement, thus taking third place among the countries of the socialist camp after the USSR and the Chinese People's Republic and ahead of Czechoslovakia and the GDR.

It is clear that an increase in cement production of 4.5 million tons in the period 1961-1965 can not be realized by merely expanding existing plants or by intensifying production in existing plants. The main increase in cement production will be achieved through the building of new units, namely in Dzialoszyn, Rudinki and Nowiny.



The "Dzialoszyn" cement plant in the wojewodztwo of Lodz was started in 1960; this plant is to have a yearly capacity of about one million tons. This plant will be equipped with four reverberatory furnaces, produced in this country, with a length of 150 m. Completion of construction is expected in 1963. The cost of building this unit will amount to 1,043 million zlotys in 1960 prices. The "Dzialoszyn" cement plant is to produce portland cement "350" and foundry cement "250" based on hearth slag.

A second newly built plant, "Rudniki", near Czestochowa will have a production capacity of about 1.3 million tons and will be ready to start production in 1964. This will be a modern cement plant producing cement by the dry method. Equipment for this plant will be supplied by the Danish firm F. L. Smidht. Three reverberatory furnaces (length 140 m), each with a daily capacity of 700 tons, are to be installed in this plant. Local limestone and slag from the "Bierut" foundry will be the raw material. The location of the plant is particularly favorable because of the convenient and cheap supply of slag by railway. The production method to be employed in this plant will be the most modern, introduced until now in only a few countries. The chief advantage of this method is the assurance of favorable indicators of heat-use, namely below 1,000 kcal of clinker. The construction cost will amount to 1,163 million zlotys in 1960 prices.

Also 1961 the building of a third plant was started, namely a combination cement and lime plant in Nowiny near Kielc. The main idea in building this plant is increasing use of limestone. It was initially intended to build only a lime plant to be based on the Nowiny deposits, the raw materials with lower CaO content to be discarded. The combination lime and cement plant will make possible the use of this refuse and thus assure a more rational use of the deposits. The plant in Nowiny supplied with equipment from our own machine industry will produce yearly over 900 thousand tons of cement, as well as about 200 thousand tons of high-quality lime for our chemical industry. The plant is to be built in the years 1961-1964, at a cost of about 1,023 million zlotys.

A part of the increase in the production capacity, namely one million tons, will be a result of expansion of existing plants. The most advanced unit in this regard is the "Saturn" cement plant which will double its production as a result of expansion of one of its production lines with our own machinery. The expansion of this plant has already been completed and production began in April of this year of an [additional] 200 thousand tons of portland cement "350".

Completion of expansion of a second plant, "Nowa Huta", will take place in 1962. This will be the only plant in Poland equipped with heat exchangers of the "Humboldt" type and with short reverberatory furnaces. This is a burning method by means of suspending the raw material in gas and is very advantageous from the point of view of fuel use. In this plant, as well as in the "Rudniki" plant, slag will be used as a raw material. In this way the previous crushing plant

in Nowa Huta will become a complete cement plant and will cooperate with the "Wiek" brick factory.

Taking advantage of certain surplus capacities of a number of departments in the "Chelm" cement plant, opened last year, the burning department was increased by two reverberatory furnaces, increasing the capacity of this plant to over one million tons. This will be one of the most effective investments because of the low cost.

The next expansion of a cement plant in the Five-year Plan will be in the "Mysoka" cement plant. A new production line (a reverberatory furnace with a production capacity of about 100,000 tons is being installed there).

Along with the above basic investments in the cement industry, modernization of certain existing plants will take place, of which the most important are the installations of concentrators in the "Odra" cement plant and the replacement of the old furnaces in the "Szczakowa" plant.

As is seen from the above data, the investment program in the cement industry for the years 1961-1965 is very important. The amount of only the central investments, reaching almost six billion zlotys indicates the dimensions of this program. The difficulties of realizing these plans will be the greater since in the years 1962-1963 the annual outlays will exceed 1.4 billion zlotys. These difficulties will be increased by the necessity of shortening the construction period of the new plants. While the "Przyjazn" cement plant with a capacity of 300 thousand tons was built in the period 1950-1955 in about 40 months, the "Chelm" cement plant with a production capacity of 800 thousand tons, took only 10 months longer during the 1956-1960 Five-year Plan. The plans for 1961-1965 foresee further shortening of the construction period. It will no doubt be possible to fulfill these tasks if investment experience is taken into consideration as well as better planning and execution in building.

The choice of location for plants in the cement industry depends, as is known, first of all on the raw materials situation. It should, however, not be forgotten that cement is a mass product and its markets are dispersed over the entire country. The present location of cement plants has spread the net of cement plants to those provinces where there were previously no such plants; nevertheless, beyond a crushing plant in Warsaw which cooperates with the "Wiek" brick factory and the small plants "Wejherowo" and "Przemko", the remainder of cement plants are located in the southern part of the country. This creates a difficult transportation problem which to only a small degree will be improved in the years 1961-1965. An additional difficulty is created, for example by initiation of production in the Lublin region (about 2 million tons) and in the Katowice region (about 2.5 million tons, in 1965).

In striving to ease the transportation difficulties, efforts have been expended for the purpose of finding raw material bases in

the northern part of the country. The first large plant in the northern part of the country will be the "Kujawy" cement plant in the wojewodztwo of Bydgoszcz. This plant will have a production capacity of 800 thousand tons and its construction will start in 1963. Also the next cement plant expected to be built in the years 1965-1968 will be located in an area now lacking a cement industry, if examination of deposits confirms an adequate quantity and quality of raw materials.

Table 3

Production of Cement in particular provinces

Wojewodztwo (Province)	1955		1960		1965	
	Thous. of tons	Share in %	Thous. of tons	Share in %	Thous. of tons	Share in %
Total	3,813	100	6,595	100.0	11,120	100
of these:						
Katowice	1,298	34.0	1,355	20.5	2,520	22.7
Lublin	384	10.1	1,236	18.7	2,290	20.6
Opole	1,125	29.5	1,370	20.8	1,590	14.3
Cracow	442	11.6	1,210	18.3	1,530	13.8
Kielc	310	8.1	517	7.8	1,500	13.5
Warsaw	--	--	482	7.3	750	6.7
Lodz	--	--	--	--	600	5.4
Remainder	254	6.7	425	6.6	340	3.0

The realization of the planned investments and intensification of production in existing plants will permit the production of the following amounts of cement in particular years of the Five-year Plan:

1961 - - 7300 thousand tons  
 1962 - - 7670 thousand tons  
 1963 - - 8470 thousand tons  
 1964 - - 9400 thousand tons  
 1965 - 11,120 thousand tons

The increase in the production of cement will not be uniform. In 1962 the small increase may cause certain difficulties; in 1965 a

production increase of nearly two million tons will permit considerably increased exports. The large increase in 1965 will result from the expected simultaneous opening of three new plants.

Considerable changes will take place in the assortment of the produced cement. This concerns particularly the increase in the share of portland cement "350" and higher grades from about 24% in 1960 to about 42% in 1965. The share of portland cement "250" will correspondingly fall from about 34% to about 16%, and the share of foundry cement will remain at about the same level. It is worth noting that in 1965 the use of slag will amount to nearly three million tons and the share of slag in foundry cement will be increased to 50%.

The changes in the assortment of the produced cements are an expression of a correct tendency in the direction of increasing the share of high grades of cement needed for industrial building, and on the other hand it assures a sufficiently large share of slag in foundry cement, which is suitable for less demanding jobs.

Among the new kinds of cement should be mentioned white cement, the production of which will start in the current Five-year Plan. With the help of this cement we shall produce colored cement in the amount of 30 thousand tons yearly. For this purpose the plant in Wejherowo is being reconstructed.

There will also be produced in small amounts special cements, particularly those with high initial endurance. In the field of technical progress the same trends will be continued as in the previous Five-year Plan. Thus there is foreseen a further mechanization of heavy work, an increase in the share of slime removers and reconstruction of furnaces. This will permit a decrease in the fuel consumption from about 1900 kcal/kg of clinker in 1960 to about 1650 kcal/kg of clinker in 1965. The modern plants will increase the production per worker from about 700 tons to about 1,000 in 1965.

An important task whose realization should take place in the Five-year Plan is reduction of dust in the plants. The new plant units will be equipped with highly effective electrofilters; similar equipment will be installed in old plants.

The durability of the lining is an important element in the intensification of cement production. For this reason, in shifting to the use of fireproof materials of national production, further efforts will be undertaken to improve the quality of these products.

In the course of realizing the current Five-year Plan shortcomings in control and measurement apparatus will be eliminated and new tools and methods of control, namely, isotopes for examining the thickness of slime and the degree of fullness of the tankers, will be used. This will permit the regular functioning of the technological processes, assure continuity of operation, and as a consequence will bring about improvement in the quality of the cement.

Further, the bulk method of transporting cement will increase, as illustrated in Table 4.

Table 4

## Transportation of Cement by the Bulk Method

	1961	1962	1963	1964	1965
Direct transportation					
a) by means of truck containers	1,050	1,260	1,550	1,850	2,200
b) by means of freight car containers	50	140	300	350	400
"Broken" transportation	-	-	150	500	900
Total	1,100	1,400	2,000	2,800	3,500

It is worth noting that the equipment both in trucks and in freight cars will come from national production, except for a small amount of equipment in the first years of the Five-year Plan.

As seen from Table 4, in the current Five-year Plan there will begin the transportation of cement other than by railway and river boats. In order to make it possible to deliver bulk cement to the centers of building activity not having their own cement plants, several intermediate stations will be built, which will receive cement by freight car and retransport it by means of truck containers.

The success in achieving the difficult tasks of further developing the cement industry is closely connected with the supply of machinery and implements of national production and their quality. The chief supplier of these machines -- Pomorze Plants for Machine Building -- will have to make an effort not to remain behind foreign suppliers of these machines from the point of view of modernity and quality.

An important role will be played by the Bureau for Projects of the Cement and Lime industry, which has accumulated considerable experience and must assure the industry better and more economical projects.

The development plan of the cement industry for the years 1961-1965 will be difficult to fulfill, but it is fully realistic. An indispensable condition for its fulfillment is the avoidance of the usual delays in the completion of new plants.